CLAIMS

1. A high-strength, high-permeability steel sheet for picture tube band having a chemical composition comprising, in mass percent, C : 0.003 – 0.010%, Si : 0.5 – 1.0%, Mn : 1.0 – 2.0%, P : 0.04 – 0.15%, S: not more than 0.02%, Al: not more than 0.030%, N: not more than 0.004% and the balance of Fe and unavoidable impurities, and having a ferrite crystal grain diameter of 10 – 100 μm and a yield stress of 300 N/mm^2 or higher.

2. A high-strength, high-permeability steel sheet for picture tube band comprising, in mass percent, C : 0.003 – 0.010%, Si : 0.5 – 1.0%, Mn : 1.0 – 2.0%, P : 0.04 – 0.15%, S: not more than 0.02%, Al: not more than 0.030%, N: not more than 0.004% and the balance of Fe and unavoidable impurities, having a chemical composition satisfying the following Equation 1, and having a ferrite crystal grain diameter of 10 – 100 μm and a yield stress of 300 N/mm^2 or higher:

$$C \times Mn \times P \geq 2.5 \times 10^{-4} \quad \ldots\ldots\ldots (1).$$

3. A steel sheet according to claim 1 or 2, wherein the content of C is greater than 0.005% to 0.010%.

4. A steel sheet according to any of claims 1 to 3, whose specific permeability μ0.35 in a DC magnetic field of 0.35 Oe is 400 or higher.

5. A steel sheet according to any of claims 1 to 4, further comprising a Zn-system or Al-system plating layer on the surface thereof.

6. A method of producing a steel sheet set out in any of claims 1 to 5

characterized in that when production is carried out by, after hot rolling, conducting one or a plurality of cold rolling and annealing runs,

(1) a coiling temperature after hot rolling is made 600 – 700 °C, and

(2) a "final cold rolling reduction ratio" and a "final annealing temperature" in a range of 750 – 900 °C are combined in accordance with a recrystallization property of the steel so that the ferrite crystal grain diameter after final annealing becomes 10 – 100 μm.

7. A method of producing a steel sheet set out in any of claims 1 to 5, further comprising:

a production process of, after hot rolling, conducting one or a plurality of cold rolling and annealing runs and conducting Z-system or Al-system hot-dip plating inline in the cooling step of the final annealing run, or

a production process of, after hot rolling, conducting one or a plurality of cold rolling and annealing runs, conducting Z-system or Al-system hot-dip plating inline in the cooling step of the final annealing run, and thereafter conducting temper rolling of not greater than 1.5%,

in which method,

(1) a coiling temperature after hot rolling is made 600 – 700 °C, and

(2) a "final cold rolling reduction ratio" and a "final annealing temperature" in a range of 750 – 900 °C are combined in accordance with a recrystallization property of the steel so that the ferrite crystal grain diameter after plating becomes 10 – 100 μm.

8. A method of producing a steel sheet set out in of claims 1 to 5, further comprising one production process among:

a production process of, after hot rolling, conducting one or a plurality of cold rolling and annealing runs and then conducting temper rolling at not greater than 1.5%,

a production process of, after hot rolling, conducting one or a plurality of cold rolling and annealing runs and thereafter conducting Zn-system electroplating,

a production process of, after hot rolling, conducting one or a plurality of cold rolling and annealing runs, then conducting temper rolling at not greater than 1.5% and thereafter conducting Zn-system electroplating, and

a production process of, after hot rolling, conducting one or a plurality of cold rolling and annealing runs, thereafter conducting Zn-system electroplating, and further conducting temper rolling at not greater than 1.5%,

in which method,

(1) a coiling temperature after hot rolling is made 600 – 700 °C, and

(2) a "final cold rolling reduction ratio" and a "final annealing temperature" in a range of 750 – 900 °C are combined in accordance with a recrystallization property of the steel so that the ferrite crystal grain diameter after plating becomes 10 – 100 μm.